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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,668	09/23/2003	Chie Fukuda	50212-539	9103

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EXAMINER

CHIEM, DINH D

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 03/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/667,668

Applicant(s)

FUKUDA ET AL.

Examiner

Erin D. Chiem

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 9-13, 24-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 14-23, 29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the amendment filed on January 11, 2006. Claims 1-29 are pending, claims 1, 2, 15, and 17 are amended.

Drawings

The objections to the drawings are withdrawn in view of applicant's amendment and remarks.

Claim Objections

The objections to the claims are withdrawn in view of applicant's amendment and remarks.

Response to Arguments

Applicant's arguments, see the remarks, filed January 11, 2006, with respect to the rejection(s) of claim(s) 15-23 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Deacon.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 7, 14-18, 22 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Deacon US (6,243,517 B1) "Deacon" hereinafter.

Regarding claim 1, Deacon discloses in Fig. 1 an integrated optical element comprising: an optical semiconductor element including a light emission layer (100), laser chip, and outputting light of a predetermined wavelength; an optical circuit element including a silica-based substrate (120 and see col. 8, line 34-col. 9 line 6), an optical waveguide (120) in which the light from said optical semiconductor element propagates and which is provided on said substrate and a grating (130) formed on said optical waveguide, the grating together with said optical semiconductor element, constituting an external resonator (col. 11, lines 25-37); a silicon bench having an element mount surface on which said optical semiconductor element and said optical circuit element are mounted, and a bonding material for fixing said optical circuit element in a predetermined position on the element mount surface of said silicon bench, while being apart from said silicon bench at a predetermined distance (col. 7, lines 63-64).

Regarding claim 2, Deacon further discloses 2 a placement position of the light emission layer, in a cross-section of said optical semiconductor element that is orthogonal to the light emission layer, is shifted further toward said silicon bench than a center of the cross-section, and said optical semiconductor element is placed on the element mount surface of said silicon bench such that a distance between the light emission layer and said silicon bench is minimized; and, wherein a placement position of said optical waveguide, in a cross-section of said optical waveguide is shifted further toward said silicon bench than a center of the cross-section, and said

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optical circuit element is placed on the element mount surface of said silicon bench such that a distance between said optical waveguide and said silicon bench is minimized (col. 5, lines 18-21 and col. 11, lines 6-7).

Regarding claim 3, Deacon discloses in Fig. 9 that said optical semiconductor element includes a semiconductor optical amplifier whose end face facing said optical waveguide in said optical circuit element is Anti-Reflection coated (col. 18, lines 23-32).

Regarding claims 15-18, 22, and 29 Deacon also discloses the integrated optical element wherein comprises N number of optical semiconductor elements and N number of optical waveguides having a reflection peak wavelength different from each other. The examiner respectfully points applicant to the same citations of the rejection to claims 1-3, 7, and 14 above because Deacon's invention was intended to have N-numbers of optical semiconductor elements coupled to N number of optical waveguides. Therefore, Deacon's invention reads upon both the claims in claimed in singular form and plural form.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The following is a quotation of 35, U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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Claim 4-5 and 19-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Deacon in view of Okada et al. (US 6,435,734 B2) "Okada" hereinafter.

Deacon teaches an integrated optical element including a light emission layer, an optical waveguide form on the silicon substrate, having grating and anti-reflective coating to increase transmission efficiency, and wherein the optical circuit is flip-chip bonded to reduce inductance power distribution to the integrated circuit.

However, Deacon does not teach the space between the optical semiconductor elements facing the optical waveguide is filled with resin having a refractive index of 1.300 or more but 1.444 or less.

Okada teaches an optoelectronic module using a silicone-type resin having refractive index $n=1.4$ (col. 3, line 26) for the purpose of reducing reflection loss.

Since Deacon and Okada are both from the same field of endeavor, the purpose disclosed by Okada would have been recognized in the pertinent art of Deacon.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to select a resin having refractive index which matches the refractive index of the waveguide to contain the light beam within the resin medium and transmit from the optical element such as the amplifier taught by Deacon to the waveguide The motivation for filling the space with waveguide refractive index matching resin is to reduced reflection loss.

Claims 6 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deacon as view of Forrest et al. (US 2002/0031297 A1).

Deacon teaches an integrated optical element including a light emission layer, an optical waveguide form on the silicon substrate, having grating and anti-reflective coating to increase

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transmission efficiency, and wherein the optical circuit is flip-chip bonded to reduce inductance power distribution to the integrated circuit.

However, Deacon does not teach the optical circuit tilts at an angle of 3 to 8 degrees.

Forrest teaches the laser to tilt at an angle of 7 degrees transmitting toward the optical amplifier for the purpose of preventing optical feedback into the optical amplifier.

Since Deacon and Forrest are both from the same field of endeavor, the purpose disclosed by Forrest would have been recognized in the pertinent art of Deacon.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ this range of angle tilt given what Forrest has taught for the purpose of preventing optical feedback even though the component taught by Forrest was a laser and not an optical circuit. One of ordinary skills in the art would recognize that regardless of what optical element is use, the criticality of Forrest's teaching is in the coupling of the optical signal relative to the optical axis. The motivation for tilting at an angle between 3 and 8 degrees is for the purpose of preventing optical feedback into the optical amplifier.

Claims 8 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deacon in view of Lee et al. (US 6,411,764 B1) "Lee" hereinafter.

Deacon teaches an integrated optical element including a light emission layer, an optical waveguide form on the silicon substrate, having grating and anti-reflective coating to increase transmission efficiency, and wherein the optical circuit is flip-chip bonded to reduce inductance power distribution to the integrated circuit.

However, Deacon does not disclose a spot size conversion structure whose FFP is 15 degrees or less.

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Lee teaches a core spot size converter having a far field angle approximately 6 degrees for the purpose of efficiently coupling the signal from the waveguide core to the photodetector (col. 5, line 6).

Since Deacon and Lee are all from the same field of endeavor, the purpose disclosed by Lee would have been recognized in the pertinent art of Deacon

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to perform mode matching by epitaxially form the waveguide to the correctness. If the thickness of the waveguide increases, the size of the mode decreases thereby the mode is compressed and the mode size becomes smaller and a more of the energy is confined within the waveguide. The motivation for forming a waveguide having the predetermined thickness such that the far field angle is 15 degrees or less is for evanescent coupling wherein mode matching is critical to the efficiency (col. 4, lines 30-67).

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin D. Chiem whose telephone number is (571) 272-3102. The examiner can normally be reached on Monday - Thursday 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Erin D Chiem
Examiner
Art Unit 2883


Frank G. Font
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